beds of the Greensand formation contributed to the Philosophical Transactions in 1885.

Hinde continued to pay much attention to cherts in later years, and showed that many of them were rich in the skeletons of radiolaria, which he described in detail. His skill in making preparations was indeed matched only by the patience with which he studied them; and it would be difficult to find more conscientious plodding work than that he accomplished when he examined and described the core from the boring in the coral-atoll of Funafuti for the report of the Royal Society's committee in 1904.

From 1882 onwards Hinde resided near London, and until 1900 he took a very active share in the administration of the Geological Society, serving three terms on the council and being a vice-president from 1892 to 1895. From 1897 until 1915 he was also an active member of council of the Palæontographical Society, and held the office of treasurer from 1904 to 1914. Whatever he undertook he carried out with intense thoroughness, and whenever he formed a judgment as to the right course to pursue, neither argument nor persuasion could alter his determination. He sometimes therefore found himself at variance with his colleagues, but his honesty of purpose was always so evident that he never lost their highest respect and esteem. His scientific worth led the Geological Society to award him the Wollaston fund in 1882, the Lyell medal in 1897, and he was elected a fellow of the Royal Society in 1896.

NOTES.

IT was stated in the *Times* of March 21 that Dr. Addison, Minister of Reconstruction, had informed a deputation of Welsh members that a Government Bill for the establishment of a Ministry of Health would probably be introduced in the House of Commons immediately after the Easter recess. Agreement has been reached on the main principles of the measure as the result of conferences with the various departments and parties affected.

A WELL-ILLUSTRATED article by M. H. Volta on the relation of inventors to the problem of dealing with hostile submarines appears in *La Nature* for February 23. It seems that the French authorities have been overwhelmed with suggestions which as a general rule show a lamentable want of consideration of the conditions under which the search for submarines and the attacks on them, when found, have to be carried out. Half a dozen ingenious arrangements for netting them and either communicating the fact to the shore or to an attendant destroyer, from which the submarine is then bombed, or providing automatically for the explosion of a bomb when the net is touched, are described. Almost any of them would act in still water not used by surface boats, but none of them are of the least use in water constantly in tidal motion, often tempest-tossed, and with craft of all kinds on its surface. In the same way many of the suggestions for dealing with the problem by the help of aeroplanes display an extraordinary amount of ingenuity, but at the same time a candid ignorance of the conditions of flight and of stability of an aeroplane.

THE House of Lords, by a majority, has recently dismissed an appeal from a decision of the Court of Appeal affirming a judgment of Mr. Justice Astbury. The action was brought by the British Thomson-Houston Company to restrain "Duram," Ltd., from infringing a patent granted to the appellants for a process for the treatment of tungsten. The respondents disputed the validity of the patent. The appellants claimed that their invention consisted in the discovery that a mere built-up body of particles of tungsten which had hitherto been known only as a powder could be sufficiently consolidated together by prolonged heating below the melting point, and could then, if worked hot, be treated as though it were a solid piece of metal, that continuous lengths of wire of filament size could be produced therefrom, and that these particles of tungsten could be made so coherent that if hot they could be hammered, rolled, or drawn. Mr. Justice Astbury held upon the construction of the specification that the patent was void for lack of subject-matter in that it covered the working of tungsten while hot, and that the working of a hot metal was merely the utilisation of the tools and routine of the metal-worker, and was not the subject of invention. His judgment has been upheld, both in the Court of Appeal and in the House of Lords.

IT is sincerely to be hoped that the very timely appeal of the Duke of Rutland, in the *Times* of March 21, will not fall upon deaf or apathetic ears. His Grace directs attention to the very serious diminution of our truly insectivorous wild birds, and appeals to the authorities at Whitehall, when sending out their commands respecting the destruction of grain-eating wild birds, to urge strongly the advisability of sparing the truly insectivorous species. In May of last year Dr. W. E. Collinge pointed out in these columns the need for the Board of Agriculture to compel the preservation of such birds, and had the suggestion that this Board should establish a Bureau of Ornithology (*cf.* NATURE, October 15, 1915) been acted upon, the authorities would have been in possession of evidence which would have shown the real state of affairs as regards such birds, and would ere now have been ready to act. Since the commencement of the war up to the present time tens of thousands of acres of woods and forests have been destroyed in the British Isles. What the effect of this drastic change will be upon wild bird life it is difficult to foretell, but it seems very likely that it will mean a large decrease in the number of insectivorous birds, and as the stumps of recently felled trees in many cases provide an ideal breeding ground for insects, we shall probably, for some years to come, be troubled with plagues of various kinds of insects, in particular those that are injurious to forests. The unusually trying winters of the past two years have taken an enormous toll of tits, flycatchers, warblers, etc., and every protection should be afforded them at once.

THE meeting of the Institution of Mechanical Engineers on March 15 was eventful in that a paper was read by a lady—Miss O. E. Monkhouse—on the employment of women in munition factories. Roughly speaking, there are now close on one million women engaged on munitions; these may be divided into three types: (1) The educated type; (2) the domestic type; (3) the ordinary factory type. The first type are already half-educated for the better class of engineering work, and are taught easily; the second train readily into good charge hands and forewomen; and the last-mentioned type are best employed on purely unskilled work of a repetition nature. There are many cases where women have acquired a knowledge of engineering work in excess of what would have been learned by an apprentice in the same period under pre-war conditions. There are three causes for this:—(1) Women have been definitely taught, whereas the apprentice had to pick up the trade; (2) women have, for the most part, been intensively taught everything in the shop itself under production conditions rather than in the school; (3) the conditions of the time have spurred on everybody to greater effort, from patriotic motives. Experience has shown that women should be controlled and organised by their own sex if the best results are to be obtained; also that, wherever there has been proper consideration for women's welfare in factories, there has been no decrease in healthy physical development, and a decided increase in mental capacity.

SOME time ago the council of the Institution of Naval Architects appointed a committee to inquire into the effects of explosions of mines and torpedoes on the structure of merchant ships. This committee, in its report, states that the loss of many cargo vessels has been due to three causes:—(*a*) The existence of watertight doors low down in the bulkheads, which could not be closed after the explosion; (*b*) fractures of suction pipes in the attacked compartment permitting water to flow into adjacent compartments; (*c*) the penetration of bulkheads adjacent to the attached compartments by fragments of plating, frames, rivets, etc. The committee made several recommendations with the object of minimising these risks, and the Government has adopted and circulated most of these. Speaking in the discussion on Sir George Carter's paper on standard cargo ships, read at the institution's meeting on March 20, Mr. Sydney Barnaby, the chairman of the committee, said the committee had expected to find that the effect of the torpedo on merchant ships would be so severe that their survival could not be hoped for reasonably. They expected to find that large areas of the shell plating were disturbed and the riveting started, and that possibly bulkheads were carried away by sudden enormous inrushes of water. Their investigations showed nothing of the kind. Large as the holes were, the ship's structure was not affected even in the immediate neighbourhood, and bulkheads had never given way. In fact, ships were being sunk because watertight compartments were not actually watertight.

WE regret to record the death on March 21 of Dr. R. S. Trevor, pathologist at St. George's Hospital, dean of the medical school, lecturer in pathology, forensic medicine, and toxicology, and curator of the museum.

Science records the death, in his sixty-second year, of Prof. E. A. Engler, president of the Academy of Science of St. Louis. Prof. Engler was professor of mathematics at Washington University, St. Louis, from 1881 to 1901, and dean of the school of engineering there from 1896 to 1901. He was for ten years president of the Worcester Polytechnic Institute.

THE death is announced, in his sixty-first year, of Sir John Anderson, K.C.B., Governor and Commander-in-Chief of Ceylon since 1916. In 1901 Sir John Anderson was in attendance on King George, then Duke of Cornwall and York, as representative of the Colonial Office, during the Royal Colonial tour. From 1904 to 1911 he was Governor of the Straits Settlements and High Commissioner for the Federated Malay States.

THE annual general meeting of the Ray Society was held on March 14, the president, Prof. W. C. McIntosh, in the chair. The report of the council and the account of income and expenditure were read and adopted. Sir David Prain was elected a vice-president in succession to Prof. E. B. Poulton, retiring by seniority, Prof. McIntosh was re-elected president, Dr. S. F. Harmer treasurer, and Mr. John Hopkinson secretary.

THE annual gold medal of the Institution of Naval Architects has been awarded to Prof. G. W. Hovgaard, of the Massachusetts Institute of Technology, for his paper on "The Buoyancy and Stability of Submarines," and the premium to Mr. J. J. King-Salter, of Sydney, for his paper on "The Influence of Running Balance of Propellers on the Vibration of Ships." As already announced, the Martell scholarship for 1917 and the Earl of Durham's prize have been awarded respectively to Mr. H. C. Carey and Mr. H. D. Leggett.

A JOINT meeting of the Institution of Electrical Engineers and the Electrical Section of the Royal Society of Medicine will be held at the Cancer Hospital, Fulham Road, S.W., on Thursday, April 11, at 7.30 p.m., instead of at King's College, as previously announced. The following papers will be read:—Dr. E. P. Cumberbatch, "Diathermy: the Use of Electricity for Heating the Tissues of the Body in Disease"; Dr. R. Knox, "Single Flash (Instantaneous) Radiography: its Possibilities and Limitations." There will also be an exhibition of electro-medical apparatus.

THE annual general meeting of the Chemical Society was held at Burlington House on March 21, when the Longstaff medal for 1918 was presented to Lt.-Col. A. W. Crossley, C.M.G., for his work in the field of hydroaromatic compounds. Prof. W. J. Pope delivered his presidential address, and at the conclusion of his address it was announced that the following new members of council had been elected:—As new vice-presidents, Prof. F. G. Donnan and Prof. W. P. Wynne; and as new ordinary members of council, Mr. J. L. Baker, Prof. J. C. Irvine, Sir Herbert Jackson, and Mr. E. W. Voelcker.

THE annual meeting of the Iron and Steel Institute will be held on Thursday and Friday, May 2 and 3. On the opening day the retiring president (Sir William Beardmore, Bart.) will induct into the chair the president-elect (Mr. Eugène Schneider), Sir William Beardmore will be presented with the Bessemer medal for 1918, and the president will deliver his inaugural address. On May 3 the award of grants from the Andrew Carnegie Research Fund in aid of research work will be announced. Twenty-one papers are included in the list for the meeting, and selections from them will be read and discussed.

THE death is announced, in his sixty-seventh year, of Dr. Samuel G. Dixon, professor of bacteriology and microscopic technology at the Academy of Natural Sciences, Philadelphia, since 1890, and president of that institution since 1896. For more than twenty years he was professor of hygiene at the University of Pennsylvania. His principal work was done in the prevention and treatment of tuberculosis, and his controversy with Prof. Koch over the priority of discovery of a method of preventing that disease in the lower animals created considerable stir in the scientific world some years ago. Of late years Dr. Dixon had rendered exceptional service in connection with the Department of Health of the State of Pennsylvania, of which he was placed at the head as commissioner when it was established in 1905.

THE following are among the lecture arrangements at the Royal Institution after Easter:—Prof. John Joly, two lectures on scientific signalling and safety at sea; Prof. Arthur Keith, five lectures on British anthropologists; Lt.-Col. C. S. Myers, two lectures on present-day applications of experimental psychology; Sir James Frazer, two lectures on (1) the folk-lore of bells,

(2) the prosecution and punishment of animals; Lt.-Col. Sir Francis Younghusband, three lectures on the abode of snow: its appearance, inhabitants, and history; Prof. E. H. Barton, two lectures on musical instruments scientifically considered; Prof. H. F. Newall, two lectures on modern investigation of the sun's surface; Prof. C. J. Patten, three lectures on problems in bird-migration. The Friday meetings will commence on April 12, when Prof. E. C. C. Baly will deliver a discourse on absorption and phosphorescence. Succeeding discourses will probably be given by Major G. I. Taylor, Sir A. Daniel Hall, Sir George Greenhill, Prof. F. Gowland-Hopkins, Dr. A. Barton Rendle, and Sir Boverton Redwood.

The annual report of the council of the Institute of Metals, presented at the recent annual general meeting, shows that the stimulating influence of war conditions upon the activities of the institute has continued to make itself felt during the year. The more general employment of scientific metallurgists in works engaged directly and indirectly in the production of munitions of war has aroused the interest of technical and scientific experts and of manufacturers in the work of the institute, and this has led to a large increase in the applications for membership. The research work organised by the Corrosion Research Committee is still being conducted with the assistance of funds contributed by the Department of Scientific and Industrial Research, by various associations and manufacturing firms, and by the institute. The Government grant-in-aid was increased during the year from 650*l.* to 1000*l.* per annum. A further Government grant-in-aid of 450*l.* has been received, together with a grant of a similar amount from the British Electrical and Allied Manufacturers' Association. The aggregate sum of 900*l.* has been placed at the disposal of the institute in order to carry out an investigation into the cause of the corrosion of condenser tubes on land by fresh water. For the purpose of conducting this investigation, a Fresh-water Corrosion Research Committee was appointed as a subcommittee of the Corrosion Research Committee.

Another Indian "miracle" has been explained by scientific investigation. The *Pioneer Mail* of January 11 reports a lecture by Sir J. C. Bose on "The Praying Palm Tree" of Faridpur. While the temple bells call the people to evening prayer, this tree has recently been seen to bow down in prostration, and to erect its head on the following morning. Large numbers of pilgrims have been attracted to the place, and offerings to the tree are said to have been the means of effecting marvellous cures. Sir J. C. Bose first procured photographs which proved the phenomenon to be real. The next step was to devise a special apparatus to record continuously the movement of the tree by day and night. The records showed that it fell with the rise of temperature and rose with the fall. The records obtained in the case of other trees brought out the fact that all the trees are moving, each movement being due to changes in their environment.

The history of William Bullock's famous museum, by Mr. W. H. Mullens, which appears in the *Museums Journal* for March, will be read with interest by all who are concerned with the rise and development of museums in this country. This account, which is not yet completed, is devoted to an analysis of the various editions of the catalogue, or "Companion," which served as the guide to the collections, and to the description of the final dispersal of the museum and its contents by auction, which took place in 1819. This issue of the *Journal* also publishes an appeal to museums from the Ministry of Food urging them to spare no effort to instruct the public as to ways and means of food production and food conservation. We are glad indeed to find that the purposes of museums are at last recognised by the Government as serving something more than "places of innocent amusement," activities which, in time of war, might well be suspended. But the work now suggested was put in hand in most museums long since. Nevertheless, this recognition is a hopeful sign. Our museums will be found only too willing to respond to every plea made to them to enlarge the sphere of their activities.

A very careful study of the nesting habits of the kingfisher (*Alcedo ispida*), by Mr. W. Rowan, appears in *British Birds* for March. Though brief, this essay adds several points of real value to our knowledge of the life-history of this bird, and, besides, sets at rest one or two matters which have long been in dispute. It is shown, for example, that two broods may be reared during a single season, and that the male takes part in brooding the young. As to whether they are fed at first by regurgitation or not Mr. Rowan was not able to satisfy himself, but it seems clear that the food given during the early stages of development consists of small crustacea and not fish, for fish were not brought to the nest until the young were several days old. By great good fortune observations were also made on the nestlings, first, while making the peculiar purring noise which has been frequently described, but probably never before witnessed, and secondly, during the act of defæcation. The voiding of the fluid excrement by the nestlings of this species assumes importance, having regard to the fact that the nest is placed at the end of a long tunnel. Being fluid, it could not be carried away by the parents, so that only by its forcible ejection from the mouth of the tunnel can the nest be kept clean.

The Madras Fisheries Bulletin (No. 4, vol. xi., 1917) consists of an interesting account of the Indian bêche-de-mer industry, written by Mr. James Hornell. Only one species of Holothurian (*Holothuria scabra*) is utilised commercially, the other abundant species being either too small or too gelatinous to cure. The Indian curing industry is of considerable antiquity, and it seems to have been introduced by immigrant Chinese. These men are said to be most careful and conscientious workers, and are generally very successful until they become ousted by local fishermen, who are exploited by Mohammedan merchants. As the result of a boycott and the promotion of a rival curing-house, the Chinese exporter become expropriated; the local curers adopt his methods, but gradually allow them to deteriorate until, in turn, the trade languishes and dies out, and is revived by some other Chinaman. Mr. Hornell gives an account of the successful work done by the Madras Government in erecting and running an experimental curing station in Palk Bay. Certain improvements in methods were introduced, and these are described. Statistics of the general Eastern trade in bêche-de-mer during recent years are appended.

The cheese mite is the cause of much damage to cheeses, especially the unpressed, ungreased cheeses of the Stilton and Wensleydale types. The attacks of this pest give rise to a serious depreciation, both in appearance and value, and in extreme cases nearly one-half of the cheese may be eaten away. An interesting account of experiments and observations on this problem is contributed by Miss N. B. Eales, of the Zoology Department, University College, Reading, to the January issue of the *Journal of the Board of Agriculture.* It was demonstrated that live mites persist in the cheese room throughout the period from December to April when the room is not in use, despite the greatest care in the application of the ordinary cleansing methods. Further experiments showed that the mites could be carried by flies and moths. The common practice of dipping mite-attacked cheeses in hot water or steaming them was found to be useless as a remedy. Fumigation with sulphuretted hydrogen or sulphur dioxide was also futile. Treatment with carbon bisulphide proved very successful, but treatment with formalin was ineffective. In an experiment with carbon dioxide the mites revived after a period of suspended animation lasting for ninety-six hours. Methods of prevention of mite attacks are indicated, and the article, which is illustrated, also includes brief notes on the systematic position, species, and life-history of the mites.

GREAT interest has been taken throughout the wide circle of his acquaintance in the experiment which Prof. W. Somerville has been conducting during the last seven years on his aptly named farm of "Poverty Bottom," with the object of demonstrating in actual commercial farm practice the soundness of the view he has so long and ably advocated, that the improvement of English land offers in many parts of the country an investment of a highly remunerative character. For his purpose a poor, thin soil on the chalk seemed to be best suited as an object-lesson, in view of the fact that the Cretaceous system is the most extensive single geological formation in England, and hence results obtained in it would be capable of wide application. In February, 1910, Prof. Somerville entered into possession of "Poverty Bottom," a farm of 530 acres, situated on the South Downs near Newhaven, and at the time untenanted, unstocked, and apparently all but barren. The outstanding measures of improvement adopted were the liberal application of basic slag, clearing off gorse, sowing of clovers, including wild white clover, and the admixture of cattle with sheep on the pastures. The use of basic slag has effected a very striking improvement of the pasturage through the development of the leguminous herbage, and the tillage land has shared in the improvement through the transference to it in the manure of nitrogen collected in the meadows. Seven years' farming has now been experienced, and the results are summarised in a most interesting article by Prof. Somerville in the current issue (February, 1918) of the *Journal of the Board of Agriculture*. This article gives many details of the system of improvement followed which cannot be summarised here. It is estimated that the head of stock has been increased by 50 per cent., whilst, when the higher quality of the stock is taken into account,, the productivity of the farm in terms of meat has been increased threefold in six years. The net financial result in any year was very largely a question of weather, but on the whole period, after deducting losses, rent, etc., a credit balance of more than 220*l*. remains. The average yearly remuneration of the farmer, it is estimated, would represent a sum of 338*l*., together with a free house, as a return for the investment of some 4000*l*. of capital.

A RECENT bulletin (No. 102, part i) of the Smithsonian Institution provides, under the title "The Mineral Industries of the United States," a useful popular account of coal and products from coal, which may be read with advantage on both sides of the Atlantic. The writer, Mr. Chester G. Gilbert, is curator of mineral technology in the U.S. National Museum, and his object appears to be to urge the importance of co-ordination and scientific control of chemical industries. This lesson will have to be learned in this country no less than in the United States, but progress in this direction will depend very much on the support given by public opinion. As, however, few of the public know much about such questions, anything which helps towards a popular understanding of them is useful. This bulletin gives within sixteen pages of print an outline of the origin of coal, a comparison of the amount of coal deposits in the several countries of the world, and an indication of the methods used in the production of coke, gas, and the other volatile products obtainable by the application of heat. The illustrations added include a curious diagram of the products derived from coal and some of their uses, which will serve to show to the uninitiated the complex character of coal chemistry.

WHEN heat flows through the surface of a solid to or from a gas in contact with the surface, it is well known that the layer of stagnant gas close to the solid interposes a considerable resistance to the flow. When the object of the arrangement has been to get the maximum flow, it has been the custom to make the gas flow rapidly over the surface of the solid. The advantage of this was pointed out by Osborne Reynolds in 1874, and it has been verified experimentally by Stanton in 1897, Nicolson in 1905, and more recently by Jordan (Proc. Inst. Mech. Eng., 1909). Another method of obtaining the same result is described by Dr. C. Hering in a paper on "A New Principle in the Flow of Heat," in the January number of the Journal of the Franklin Institute. It is found that the resistance of the film of gas in contact with the solid may be greatly reduced by increasing the temperature of the surface of the solid. The flow through the bottom of a kettle may, according to Dr. Hering, be increased twenty-sevenfold by raising the temperature of the metal surface in contact with the gas flame to 725° C. This can be done by interposing a thermal resistance between the surface in contact with the flame and that in contact with the water. It is proposed to secure the same result in steam boilers by attaching metallic lugs to the flame side of the flue, of such length that their ends will be at about 725° C. The results of a trial of the method on a practical scale will be awaited with considerable interest.

AN interesting discussion on nitre-cake held by the Nottingham Section of the Society of Chemical Industry is reported in the Journal of the society for December 15 last. According to Mr. G. C. Grisley, the most successful method of utilising nitre-cake is to substitute it for sulphuric acid in the manufacture of hydrochloric acid and salt-cake from salt. It has also been employed to obtain ferric sulphate for sewage precipitation by turnacing burnt pyrites with nitre-cake, grinding, and leaching the product with water. Further, it could be used as a diluent for sulphuric acid in the manufacture of superphosphate. Dr. Terlinck stated that he had used nitre-cake as a substitute for sulphuric acid in the recovery of fats from wool wash-waters, and he proposed to use it in the purification of ammonium salts. The necessity for workmen who handled nitre-cake being provided with wooden clogs and india-rubber gloves was emphasised by Mr. W. G. Timmans, who stated that in the Nottingham district nitre-cake was used for lace bleaching, grease extraction from wool, pickling metals, and mineral-water manufacture. Dr. E. Naef pointed out that the suggestions hitherto advanced were based on the acidity of the nitre-cake, and that the sodium sulphate remaining had still to be utilised. One way of doing this was to reduce it to sodium sulphide by grinding with anthracite, charcoal, or boiler coal and heating at 500°–600° C., the yield obtained being 95–98 per cent. Sulphur dioxide is evolved if nitre-cake (rather than sodium sulphate) is used, but this could be avoided by neutralising the free acid with soda ash during the grinding. For the production of sulphur dyes alone 40,000 tons of sodium sulphide are required per annum. Dr. Naef has found that by treating nitre-cake at 300°–350° C. with superheated steam 90 per cent. of the free acid is driven off, but the product is too dilute to concentrate.

VOL. ii., No. 4, of the Memoirs of the College of Science, Kyoto Imperial University, contains a series of metallographical publications by Prof. Chikashige and his pupils. These deal with the working out of the equilibrium diagrams of the following series of binary alloys: (1) Tellurium and aluminium, and (2) selenium with antimony, cadmium, zinc, and aluminium respectively. The methods adopted are those in general use and do not call for any special mention. The authors content themselves with the determination of the main features of the diagrams, without saying anywhere whether any of the alloys are likely to prove of practical value.

THE reviewer of Dr. Knox's book on "Radiography and Radio-therapeutics," in NATURE of March 14, remarked: "We regret the omission of the bibliography." The publishers direct our attention to the fact that a selection of the literature of the subject appears on p. iv. at the end of the volume. We are sorry that our reviewer did not notice this bibliography in spite of having looked for it, and that he incorrectly said it had been omitted.

OUR ASTRONOMICAL COLUMN.

Planetary Perturbations and Æther-drift.—In a paper entitled "Continued Discussion of the Astronomical and Gravitational Bearings of the Electrical Theory of Matter" (*Philosophical Magazine*, February, 1918), Sir Oliver Lodge continues a discussion commenced by the suggestion that the shift in Mercury's perihelion might be explained by a drift of the solar system through the æther. Prof. Eddington showed that a drift that would account for this would bring inadmissibly large errors into the other elements of the inner planets. Sir Oliver Lodge admits an error in his former work in the following words: "If the additional inertia due to motion is acted on by gravity the varying factor *m* will enter twice into the equation of motion and the perturbation will be increased instead of being annihilated." Making this change, he examines once more whether it is possible to find a drift that will satisfy the observed perturbations within their limits of error. After many trials, he concludes that they cannot all be satisfied in this way. He tends to the conclusion that gravity has joined the conspiracy to defeat our efforts to detect motion through the æther, and that we are led to accept the conclusion that the gravitation-constant itself is a function of the speed of the attracting masses. In support of this he quotes some electrical results which lead him to believe that electrical attraction does actually vary with speed. "If such a fact be established [for gravity] it may begin to throw some light on the family relationship of that force."

Perturbations of Neptune's Satellite.—In a communication to the *Observatory* for March, Prof. Armellini states the chief results of an investigation referring to the well-known perturbations of the satellite of Neptune. The pole of the satellite's orbit describes a circle about a point in R.A. 288° and declination 40°, and two hypotheses have been suggested to account for this motion. Tisserand attributed it to the attraction of the protuberant matter about the planet's equator, whilst H. Struve suggested that it might be due to some unknown perturbing mass. Prof. Armellini has investigated the latter hypothesis on the supposition that the unknown body is a satellite, which may not have been observed on account of its small mass. He has shown that a satellite having a mass sufficient to explain the observed perturbations would probably not be much fainter than the 14th magnitude, and would be unlikely to have escaped detection. Struve's hypothesis is accordingly considered much less probable than that of Tisserand.

Motion of Our Stellar System.—Dr. V. M. Slipher, director of the Lowell Observatory, has made a preliminary investigation of the motion of our stellar system, on the supposition that the spiral nebulæ are stellar systems, similar to our own, situated at very great distances (Proc. American Philos. Soc., No. 5, 1917; quoted in Journ. R.A.S. Canada, vol. xii., p. 72). The radial velocities of twenty-five spiral nebulæ have been determined, and the motion of our system with respect to them has been derived in the same way as that of the sun with respect to the stars of our own system. The somewhat scanty material available indicates that we are moving in the direction of R.A. 22 hours, and declination −22°, with a velocity of about 700 km. per second. Dr. Slipher considers that these observations strengthen the view that our stellar system and the Milky Way are to be regarded as a great spiral nebula which we see from within, and that if the solar system has evolved from a nebula, the nebula was probably not one of the class of spirals dealt with in this investigation.

FOOD RATIONS FOR MANUAL WORKERS AND SCIENTIFIC LABORATORIES.

IT has been announced in the Press that the Ministry of Food intends to grant extra rations to manual workers from some date after April 7. The extra ration will not be ordinary butcher's meat, but bacon; and the eligibility of applicants will be determined by sub-committees of the local Food Control Committees, to which the Food Ministry will issue a classification of those persons entitled to extra food. The motive of this proposal is evidently sound from the scientific point of view. Considerable difficulties are, however, likely to arise in practice owing to the lack of exact knowledge respecting the energy needs of different kinds of industrial work. Relatively few experiments have been made and published, those of Amar upon metal filers being the best known. It is to be hoped that the scientific advisers of the Food Ministry will organise physiological investigations to elucidate disputed points. Complete calorimetric measurements are, of course, impracticable, but sufficiently precise results can be reached through a study of the respiratory metabolism by Zuntz's method, the apparatus needed for which is portable.

The Medical Research Committee has recently brought to the notice of Lord Rhondda the special difficulties confronting the directors of pathological and other scientific laboratories in the regulations relating to food supply. Many instances have been brought to the notice of the committee in which scientific work of the highest national importance has been endangered by difficulties in obtaining under existing conditions necessary foodstuffs in sufficient amount or variety, though the total amount required is quite negligible in relation to the general food supply. The Ministry of Food has now issued the following memorandum for the guidance of Food Control Committees:—

Supplies of Foodstuffs to Pathological Laboratories.

(1) Lord Rhondda's attention has been directed to the difficulties experienced by scientific laboratories in obtaining the small quantities of foodstuffs required by them for the purposes of their scientific work.